

AI for Services Quality Use Case - Smart Government

Statement of Work (SoW)

Overview on Smart Government

Smart Government should be understood as the management of business processes related to government and administration with the help of intelligently networked information and communication technologies (ICT). Intelligently networked governance and administration uses the opportunities of interconnected smart objects and cyber-physical systems for the efficient and effective performance of public tasks. This includes the portfolio of e government and open government, embracing big data and open data. At its core, it is about sustainable government and administrative action in the age of the Internet of Things and the Internet of Services, whose technical foundation is on the Internet of Systems, the Internet of People and the Internet of Data. This definition includes the local or municipal level, the regional or state level, the national or federal level as well as the supranational and global level. Included is thus the entire public sector, consisting of legislative, executive and judicial branches as well as public enterprises [1].

The UN E-Government Survey report looks at how e-government can facilitate integrated policies and services across the three dimensions of sustainable development, and is produced every two years by the UN Department of Economic and Social Affairs. It is the only global report that assesses the egovernment development status of the 193 UN Member States. It serves as a tool for countries to learn from each other, identify areas of strength and challenges in e-government and shape their policies and strategies in this area. It is also aimed at facilitating discussions of intergovernmental bodies, including the United Nations General Assembly and the Economic and Social Council, on issues related to e-government and development and to the critical role of ICT in development. Countries in all regions of the world are continuing to make strides in their efforts to improve e-government and to provide public services online according to a new report launched by the United Nations Department of Economic and Social Affairs today [4].

Technology and Architecture

Several technologies and architectural models are contributing to such large-scale solution required to operate a smart government. Some of these key pillars [4]:

- Developing efficient digital infrastructure.
- Cybersecurity solutions.
- Artificial Intelligence and Data-Driven Solutions.

- Digital Services Platform and Applications
- Digital Legislative/Regulatory Framework.

The Role of Citizen e-Services

E-services (electronic services) are services which make use of information and communication technologies (ICTs). The three main components of e-services are:

- Service provider;
- Service receiver; and
- The channels of service delivery (i.e., technology).

For example, with respect to public e-service, public agencies are the service provider and citizens as well as businesses are the service receiver. For public e-service the internet is the main channel of e-service delivery while other classic channels (e.g. telephone, call center, public kiosk, mobile phone, television) are also considered. Some of the key benefits of e-services [5]:

- Accessing a greater customer base
- Broadening market reach
- Lowering of entry barrier to new markets and cost of acquiring new customers
- Alternative communication channel to customers
- Increasing services to customers
- Enhancing perceived company image
- Gaining competitive advantages
- Enhancing transparency
- Potential for increasing Customer knowledge

Architecture of e-Services

Depending on the types of services, there are certain functionalities required in the certain layers of e-service architectural framework, these include but are not limited to [5]:

- Data layer (data sources),
- Processing layers (customer service systems,
- Management systems,

- Data warehouse systems,
- Integrated customer content systems),
- Exchange layer (Enterprise Application Integration– EAI),
- Interaction layer (integrating e-services), and
- Presentation layer (customer interface through which the web pages and e-services are linked).

Services Quality Management

Operating e-Services is one key element for smart government digital transformation with the objective of enhancing quality by eliminating obstacles and time/effort consuming overheads like queues at the governmental offices. Coupled with an overall e-governance framework, it also enhances the internal operations need to be done by government officials/employees who are reviewing and handling those issues. This use case focus on important part of resolving citizens' issues like complains, comments, feedback and other forms by automating eh analysis, discovery, prediction and modeling of textual content to help officers/employees perform better and deliver better quality to citizens.

Once a citizen posts some complain, feedback, comment or issue, the main attributes are to be ingested to the AI engine including the plain text (subject, body, comments, name, address...etc.) as well as structured variables (city, governorate, type, category...etc.). The AI engine will run several text mining and NLP processing like sentiment analysis, topic modeling, emotion detection, Summarization, part of speech tagging, NER, CR, discourse, word sense, intent...etc. against the text content in addition to analytical processing on structured attributes like action recommendation, severity level, and classification of priority. Data mainly includes complaints and other feedback from citizens on the for example on shakwa.eg and other governmental online services:

#	Data Variable	Description
1	Complain Subject	The title provided by citizen for his posted complain, feedback or comment
2	Complain body	The full description provided by the citizen describing his issues or things he would like to get resolved
3	Attachments	File 1, file 2...etc.
4	Gov Organization	The main governmental sector responsible for the issue. Could change during handling by reassigning to another one or more
5	Governorate	The place where the issue took place – state
6	City	The place where the issue took place – city

7	Address	The address of the citizen posting the complain
8	Comments	Additional posted comments by the citizen during handling the complain by the system
9	Date	The date and time the issue has been submitted – additionally the date and time associated with changed status
10	Status	The different statuses the issue is assigned over the processing workflow while being resolved by the assigned governmental organization

AI Solution Specifications

To address the services quality management in governmental digital transformation where offering online and onsite e-services to citizens is at the core, many topics need to be covered where AI solution could be of excellent fit leveraging the different types of localized data coming from citizens like complaints, comments, and casual feedback. In this use case, we are including the following main topics under each could be several areas of implementation. The reset of the activities in this project from 2 to 18 are focusing on detailed process of getting real-life solution in place:

- **Topic #1: Topics Discovery:** Analyzing, ranking and linking the main topics within complains, comments, feedback and other forms of citizens' issues to compare with the associated metadata like source of issue, target governmental sector, city where issue is originated, next recommended actions, severity level, link to known issues or events.
- **Topic #2: Summarization:** Generating a conclusion or an abstracted content of the original complains, comments, feedback and other forms of citizens' issues so that it can make the review by government official more focused and faster including segmentation into multiple parts where each part can be handled by different sectors simultaneously.
- **Topic #3: Semantics Recognition:** Discovering and modeling the lexical semantics within complains, comments, feedback and other forms of citizens' issues inducing named entities, intent, word-sense disambiguation, entity linking, terminology extraction to implement predictive review of the citizens' issues.
- **Topic #4: Sentiment Analysis:** Analyzing complains, comments, feedback and other forms of citizens' issues to produce a subjective conclusion about the state of the content being positive, neutral or negative thus help present initial impression to the reviewer.

- Topic #5: Emotion Detection: Identifying and recognize the specific human emotion like angry, depressed, happy, confused, influenced...etc. imposed by complains, comments, feedback and other forms of citizens' issues to be presented to the reviewer.
- Topic #6: Contextual Modeling: Conducting variety of essential modeling and analysis that can help enhancing other higher NLP models including vectorization, stemming, part of speech tagging, ontology, discourse, coreference, record linkage with focus on localized language and dialects.
- Topic #7: Statistical Analysis and Simulation: set of models to analyze, predict and simulate important events for data processed in above topics including columnar, vectors and graph structures for example associating NLP and text mining outcomes with metadata of the citizens' issues like date, location, age, category, status...etc. helps finding distribution, root causes, patterns, making what-if scenarios aiming at enhancing services quality and governmental sectors performance.

References & Resources

#	Topic	Source
1	Haepler Definition of Smart Government	https://www.zeppelin-university.com/institutes/togi/smartgovernment.php
2	Digital Transformation in Egypt	https://mcit.gov.eg/Upcont/Documents/Reports%20and%20Documents_1872022000_Digitization_in_Egypt.pdf
3	Smart Government e-Services Developments in Egypt	https://mcit.gov.eg/en/Digital_Egypt
4	E-Governance and Digital Transformation in Egypt	http://81.21.105.237/upload/e-governance-and-digital-transformation---egypt-2.pdf
5	Comprehensive Article on E-Services	https://en.wikipedia.org/wiki/E-services
6	From Traditional Services to e-Services - a Business Value Analysis	https://aisel.aisnet.org/sigbd2016/3/